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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,394	02/27/2004	Yukio Koyanagi	22040-00030-US	2393

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CONNOLLY BOVE LODGE & HUTZ LLP
SUITE 800
1990 M STREET NW
WASHINGTON, DC 20036-3425

EXAMINER	
LAO, LUN S	

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/708,394	KOYANAGI, YUKIO	
	Examiner	Art Unit	
	Lun-See Lao	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. This action is in response to the amendment filed on 03-01-2006. Claims 1, 7, 12 and 14 have been amended and claim 15 has been canceled. Claims 1-14 are pending.

Claim Rejections - 35 USC § 103

2. Claims 1, 4-7 and 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over kawano (US PAT. 6,816,597) in view of Wilkinson (JP 06-326555).

Consider 1 and 7 Kawano teaches a filter device, comprising:

a first FIR filter (see fig.2, F2) for multiplying a signal of each tap of a tapped delay line (D2,2…D2.4) by several times according to given first filter factors (W2.2 to W2,5) and then performing addition and output, the delay line being made up of a plurality of delay units (D2, 2. D2, 4); and

a second FIR filter (FIG.2, F3) for multiplying a signal of each tap (D3,2…D3,4) of a tapped delay line by several times according to given second filter factors (W3,2…W3,4) and then performing addition and output, the delay line being made up of a plurality of delay units (D3,2..D3,4); and an output coupled to and simultaneously receiving both a first output (Y2) of the first FIR filter (F2) and a second output (Y3) of the second FIR filter (F3), wherein the first filter factors (W2,1 to W2,5) have a symmetrical sequence in which values are set so that a sum is not zero , a sum (A2,5, A3,5) of every other term is equal to a sum of the other every other term with the same signs (see fig. 2 and col. 5 line 7-col. 6 line 22); and the second filter factors have a

symmetrical sequence in which values are set so that a sum is not zero (see fig.2, F3 and col.5 line 7-col6 line 22); but Kawano does not clearly teach that the second filter factors have a symmetrical sequence in which values are set so that a sum is zero and a sum of every other term is equal to a sum of the other every other terms with opposite signs.

However, Wilkinson teaches that the second filter factors (the first filter factor is composed of the ratios of -1, 0, 9,16, 9, 0, -1) have a symmetrical sequence in which values are set so that a sum is zero and a sum of every other term is equal to a sum of the other every other terms with opposite signs (the second filter factor is composed of the ratios of 1,0, -9,16, -9,0,1 and see figs 5, 7 and page 5 of 9, lines 1-32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Wilkinson into Kawano to provide a half-band filter in respective low and high-band passing parts, placing the filters in an opposite stage and supplying the required symmetry.

Consider claim 12 Kawano teaches a sound quality adjusting method, comprising:

a first filtering step, implemented by a first FIR filter (see fig.2, F2), of multiplying a signal of each tap (W2,2 to W2,5),which delays an input sound signal, by several times by using first filter factors (W2,2 to W2,5) and then performing addition and output, the first filter factors having a symmetrical sequence in which values are set so that a sum is not zero and a sum of every other terms is equal to a sum of the other every other term with the same signs;(see fig.2 and col. 4 line 56-col. 5 line 49), and

a second filtering step, implemented by a second FIR filter (see fig.2, F3), of multiplying a signal of each tap of a tapped delay line (M3,2 to M3,5), which delays an input sound signal, by several times by using second filter factors (W3,2 to W3,5) and then performing addition (A3,2 to A3,5) and output, the second filter factors (W3,2 to W3,5) having a symmetrical sequence are set so that a sum is not zero (see fig.2, F3 and col.5 line 7- col. 6 line 22);and

a gain controlling step (see col.7 line 22-27) of simultaneously controlling a gain of a sound signal having passed through the first FIR filter (see fig.2, F2) and a gain of a sound signal having passed through the second FIR filter (see fig.7, f2); and a summing step (see fig.2, A2,2 to A2,5, A3,2 to A3,5 and B1-B3) of summing the sound signals having undergone simultaneously gain control in the gain controlling step (see col. 7 lines 22-27) and outputting a sum (B1-B3 and see col.5 line 7 –col. 6 line 22); but Kawano does not clearly teach that the second filter factors have a symmetrical sequence in which values are set so that a sum is zero and a sum of every other term is equal to a sum of the other every other term with opposite signs.

However, Wilkinson teaches that the second filter factors have a symmetrical sequence in which values are set so that a sum is zero (the second filter factor is composed of the ratios of 1,0, -9,16, -9, 0, 1 and see figs 5, 7 and col.5 lines 1-32); and a sum of every other term is equal to a sum of the other every other term with opposite signs (the second filter factor is composed of the ratios of 1,0, -9,16, -9, 0, 1 and see figs 5, 7 and col.5 lines 1-32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Wilkinson into Kawano to provide a half-band filter in respective low and high-band passing parts, placing the filters in an opposite stage and supplying the required symmetry.

Consider claims 4,10,13 and 11, Wilkinson teaches that the sound quality adjusting device ofthe sequence of the first filter factors is composed of ratios of -1, 0, 9, 16, 9, 0, and -1 and the sequence of the second filter factors is composed of ratios of 1, 0, -9, 16, -9, 0, and 1 (see fig.7 and page 5 lines 1-15) and the sound quality adjusting device at least one of the first filter and the second filter is cascaded to a subsequent stage of at least one of the first filter and the second filter (see fig.2 and page 1 lines 33-38 and see the discussion above claims 1,7,13).

Consider claim 5-6, Kawano teaches that the sound quality adjusting device of at least one of the first FIR filter (see fig.2, F2) and the second FIR filter (F3) is çascaded to a subsequent stage comprising a stage comprising a filter duplicating at least one of the first FIR filter (F2) and the second FIR filter (F3 and see col. 5 line 7 – col. 6 line 22); and the first FIR filter (see fig.2, F2) and the second FIR filter (F3) are cascaded in parallel to a subsequent stage çomprising anther first FIR filter (F2), the first FIR filter (F2) and the second FIR filter (F3) being cascaded in parallel to a subsequent stage of the second FIR filter (F3), wherein control is performed on a gain of an output signal from each of the cascaded FIR filters (F1 to F3) in the subsequent stage, and sound signals having been subjected to gain control (see col. 7 lines 22-27) are summed and outputted (B1 to B3 and col. 5 line 7-col. 6 line 22).

Consider claim 14, Kawano teaches that an FIR filter designing method for designing FIR digital filters (see fig.2 (F1 to F3)), the method comprising:

setting frequency characteristics (see figs. 7-8) to be complementary to each other and allowing a total gain of the FIR digital filters to serve as a reference value at all frequencies (col. 2 line 6-29);

establishing first filter (see fig.2 F2) coefficients (see fig. 2, W2,3 to W2,5) having a first symmetrical sequence in which a sum of the first filter coefficients is not zero (see col. 4 line 56-col. 5 line 49) and a sum (A2,5) of every other coefficient in the first symmetrical sequence is equal to a sum of every other coefficient having a same sign (+ sign and see col. 13 line 35-col. 14 line 68);

changing (by digital filter factors) the sequence of the first filter (F2) coefficients and determining second filter (F3) coefficients having a second symmetrical sequence in which a sum of the second filter (F2) coefficients is not zero (see col. 5 line 7-col.6 line 22),

wherein the first filter (F2) coefficients and the second filter (F3) coefficients are used, respectively, as the filter factors of first and second FIR digital filters F1 and F2) whose outputs are simultaneously summed together (B3 and see col. 5 line 7-col. 6 line 22); but Kawano does not clearly teach that determining second filter coefficients having a second symmetrical sequence in which a sum of the second filter coefficients is zero and a sum of every other coefficient in the second symmetrical sequence is equal to a sum of the other every other coefficient having an opposite sign.

However, Wilkinson teaches that determining second filter coefficients having a second symmetrical sequence in which a sum of the second filter coefficients is zero and a sum of every other coefficient in the second symmetrical sequence is equal to a sum of the other every other coefficient having an opposite sign (the second filter factor is composed of the ratios of 1,0, -9,16, -9, 0, 1 and see figs 5, 7 and col.5 lines 1-32).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Wilkinson into Kawano to provide a half-band filter in respective low and high-band passing parts, placing the filters in an opposite stage and supplying the required symmetry.

3. Claims 2-3 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano (US PAT. 6,816,597) as modified by Wilkinson (JP 06-326555) as applied to claims 1 and 7 above, and further in view of Kovtun (US PAT. 6,512,944)

Consider claims 2, 8 and 3,9, Wilkinson teaches the sound quality adjusting device of the second filter factors, signs of values other than a median of the sequence of the first filter factors are changed while causing values of the sequence to remain the same (see fig. 7 and detailed description page 4 [0022]- page5 [0020]); and the sound quality adjusting device of the second filter factors, signs of values other than a median of the sequence of the first filter factors are changed while causing values of the sequence to remain the same (see fig. 7 and detailed description page 4 [0022]- page5 [0020]); but Wilkinson and Kawano do not clearly teach the causing absolute values of the

sequence to remain the same; and the median of the sequence is subtracted from a reference value.

However, Kovtun teaches the causing absolute values (see scale factor formula col.5, line 1-15) of the sequence to remain the same, and the median of the sequence is subtracted (fig.2, 34) from a reference value (see figs1-6 col. 4 line 14-col. 5 line 51)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Kovtun into the teaching of Wilkinson and Kawano to provide an improved, low-pass filter capable of removing noise signal component from higher frequency signal.

4. Claims 2-3 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano (US PAT. 6,816,597) as modified by Wilkinson (JP 06-326555) as applied to claims 1 and 7 above, and further in view of Honma (US PAT. 5,557,646).

Consider claims 2, 8 and 3,9, Wilkinson teaches the sound quality adjusting device of the second filter factors, signs of values other than a median of the sequence of the first filter factors are changed while causing values of the sequence to remain the same (see fig. 7 and detailed description page 4 [0022]- page5 [0020]); and the sound quality adjusting device of the second filter factors, signs of values other than a median of the sequence of the first filter factors are changed while causing values of the sequence to remain the same (see fig. 7 and detailed description page 4 [0022]- page5 [0020]); Wilkinson and Kawano do not clearly teach the causing absolute values of the

sequence to remain the same; and the median of the sequence is subtracted from a reference value.

However, Honma teaches the causing absolute values of the sequence to remain the same (by the controller 14, and see fig. 1); and the median of the sequence is subtracted from a reference value (see fig.1 and col.6 line 61-col.8 line10).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Honma into the teaching of Wilkinson and Kawano to provide an amplitude of a digital signal output is converged quickly and securely to a predetermined value, thereby obtaining a reception output with a multipath component eliminated therefrom.

Response to Arguments

5. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamada (US PAT. 6,970,569) is recited to show other related the sound quality adjusting device and filter device used therefor, sound quality adjusting method, and filter designing method.

8. Any response to this action should be mailed to:

Mail Stop ____(explanation, e.g., Amendment or After-final, etc.)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Facsimile responses should be faxed to:
(703) 872-9306
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Alexandria, VA 22314

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao,Lun-See whose telephone number is (571) 272-7501 The examiner can normally be reached on Monday-Friday from 8:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chin Vivian, can be reached on (571) 272-7848.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (571) 272-2600.

Lao,Lun-See L.S.
Patent Examiner
US Patent and Trademark Office
Knox
571-272-7501
Date 05-05-2006

VIVIAN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600